cies is *C. tuberosus* which was found growing from decaying vegetables in France.

There can be no question that the ultimate rotting is caused by bacteria; several have been isolated. Among them *Bacillus subtilis*, a very common species. A portion of raw beet was taken out, inoculated with diseased beet placed in an incubator at 42° C. The following morning it was covered over with the growth of a bacillus. A strong odor of boiled beets was given off, while the beet was black. This bacillus had developed to the exclusion of everything else. A second inoculation was made with a pure culture of the organism, but the results were not very decisive. The raw beet did not take on the sudden blackening, nor was the odor so decided. Some of the other bacteria found are shown (Plate IV, figs. x, xi, xv, xvi, xviii). Several other saprophytic fungi have been found, among them a species of *Fusarium* forming white patches. This appears to be *Fusarium betæ* which has been compared with a *Fusarium* on a beet kindly sent me by Mr. Ellis. The *Fusarium* is a secondary growth and is in no way responsible for the disease (Plate IV, figs. 2, 3, and 4). A *Fusarium* unidentified was found a few years ago on decaying beets in cellars. It may be responsible for some of the cellar rot.

## VI.—Summary.

The principal fungus diseases of the sugar beet are Beet Rust, White Rust of Beets, Spot Disease of Beets, Root-rot and Beet Scab. All of these diseases with the exception of rust occur in Iowa. Beet Rust is caused by *Uromyces betæ* and is closely related to bean, oats and other rusts. White Rust of Beets forms white blotches on the leaf, which consist of a large number of small spores. The fungus appears to be *Cystopus blitii*, which occurs on some of the Amaranths. Spot Disease of Beets manifests itself by producing round spots, at first not larger than a pin head, these spots become larger with age and finally cause the leaf to become black in color. The disease is caused by a fungus known as *Cercospora betæ*. The disease can no doubt be checked by Bordeaux mixture or ammoniacal carbonate of copper. Root-rot is caused by a fungus which appears to be related to *Rhizoctonia betæ*, a fungus discovered some years ago in Germany. It appears to have done some injury to the

sugar beet in Europe. The fungus causes a total destruction of beet, it is entirely worthless for sugar. So far the disease has not been reported from other parts of the state, though according to Prof. Galloway it occurs in Michigan. Rotation of crops should be practiced. Two root crops should never follow each other. Beet Scab, which has also been found in a few cases, appears to be identical with deep scab of potatoes. Sugar beets should never follow potatoes. In both diseases (Beet Scab and Root-rot), care should be used in cultivation. Cultivators and other implements should be kept rigidly clean. Do not pass from a diseased field to one where the disease does not occur. Infectious material is often carried in this way.

## A Slide-Carriage and Object-Finder.

By F. L. J. BOETTCHER,

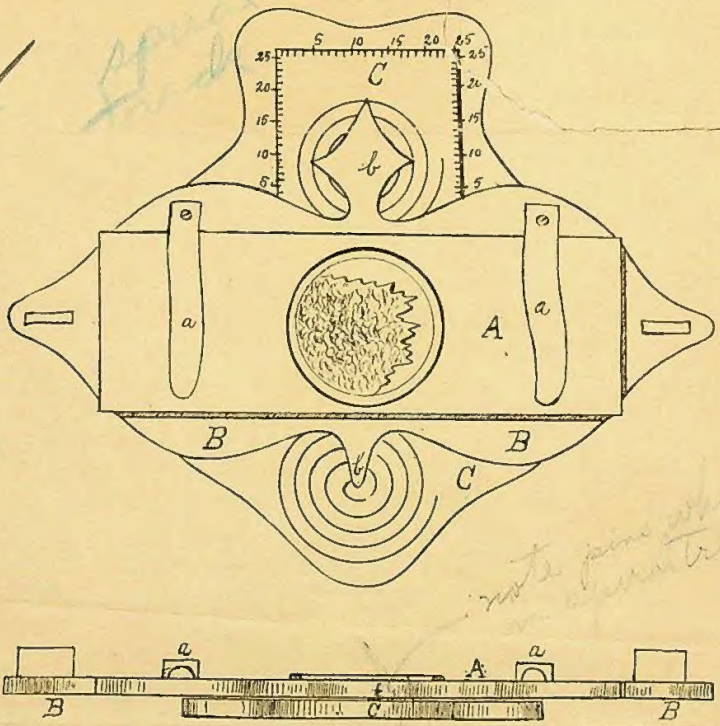
WASHINGTON, D. C.

It has no doubt occurred in the experience of many others, as it has in my own microscopical work that some item of minute dimensions, which had been passed over for future study or comparison, could not be found at the moment when it was most needed for examination or for exhibition. This difficulty sometimes becomes particularly embarrassing in the class-room, when after several minutes of fruitless search the vexed preceptor is obliged to confess: "Gentlemen. the thing which we are discussing is there, but it cannot be found at present: let us pass on." And no wonder, if we consider that even so low a magnification as 100 diameters will offer in an object 1 centimeter in diameter 70 to 80 fields, while a power of 600 will furnish 1500 to 2000 fields, and if the object sought for in a power of 600 measures 1 millimeter in diameter it will be 1-30,442,478 of the whole. It is sufficiently clear, therefore, that such a search can be successful only by mere accident or as a result of long and patient parallel motion of the slide.

I have had my share of these vexations. To overcome these difficulties and to add to the usefulness of the microscope, I submit this little contrivance. It is as simple as I hope it will be practical. Its object is twofold; first, to bring every part of the section, by the shortest route once under the microscope

and once only; second, to enable any point in the section to be recorded as precisely and definitely as a star in a constellation.

In the accompanying figure, A represents the regulation slide, 3 inches by 1 inches, lying in a recess or hollow of the carriage, B, into which it fits closely and is held firmly by the clamps *a a*. The clamps being pushed aside it can easily be removed by its protruding corners. B, the carriage, lies firmly upon C, the table and contains at *b b*, two short pins which rest equally




firmly in the two spiral grooves. These two pins will direct the motion applied. The section describing exactly similar revolutions, as the pins *b b*, will bring exactly the width between the lines of the spiral groove under the focus as a definite part of the same, decreasing in diameter as the power of magnification increases. The diameter of the field and the space between the lines of the spiral groove can correspond exactly only with the

power for which the instrument has been made and the possibilities by between 50 and 250 diameter magnification. To find the actual field, measure the diameter of the field in millmeters and divide this by the previously ascertained magnification. The diameter of the actual field will be the exact distance between the lines of the spiral groove. In most instruments, 100 to 150 diameters give fields of 1 millimeter diameter, just wide enough for the grooves, while the powers beyond these furnish too small a space. It should therefore be exactly fitted for one of the lower powers on the nose-piece of the microscope. C, the table, is firmly but not permanently attached to the stage of the microscope by means of pins and sockets, clamps, or screws according to the stage of the instrument.

In summing up, therefore, it is claimed, that this instrument brings every portion of the slide in succession and by the shortest route into the focus of the microscope; second, that it admits of more definite estimates of the contents of a slide; and third, that any object on the slide may be easily and definitely recorded and found again with very little trouble. A patent has been applied for.

## Two New Blood Stains.

By W. DRESCHER,

ROCHESTER, N. Y.

Microscopists and Clinicians have for some time felt the need of some method for the fixing and differential staining of the various formed elements of the blood. Many attempts have been made to answer this need, many methods have been suggested, none seeming, however, to combine so many of the essential qualities of a "good stain" as the method suggested and perfected by Dr. Ehrlich of Berlin.

We should add to our list of re-agents two of the blood-coloring solutions, now very generally used in Europe. In doing so, we aid in bringing them into more general use, particularly in the laboratories and hospitals of this country.

The stains are,—(1) Ehrlich's Neutrophile Stain, (2) Chenzinskie's Eosin Methylene Blue Solution. The formulæ for which are as follows:

## EDITORIAL.

**Terrace dust.**— The interesting paper on this subject in the March number, page 72, has been replied to by Mr. Cunningham, on page 205 of the present number. The samples which he forwarded we have hastily examined. They bear a striking resemblance to the dust found in Calcutta, but absolute identity of origin cannot be affirmed at present. We shall be glad to receive some "dust" from Calcutta for comparison with that of Mr. Cunningham. We have forwarded the samples submitted by him to Calcutta.

The final assumption would be that the spherules in the dust are "of the earth, earthly," and not of "cosmic origin" as was at first suspected by the Calcutta observer.

## MICROSCOPICAL APPARATUS.

**Hicks' New Medical Microscope.**—Mr. Jas. J. Hicks, of Hatton Garden, whose name is so indelibly stamped on the philosophical instrument industry, had not been long engaged in the construction of fine microscopes before he introduced a pattern which has already made its mark. The "Medical" Microscope is expressly designed to provide doctors with a first class microscope at a low figure. It is fitted with a bright solid foot that enables it to stand with exceptional steadiness, and shaking is reduced to an absolute minimum. It possesses two eye-pieces and two specially-constructed objective glasses, of 1-6 inch and 1-10 inch; a massive circular brass stage, flat and concave mirrors, that are attached to a revolving arm by a very neat motion, which enables the observer to place them in any position to the right or left of the stage and either above or beneath it. The microscope has also coarse and fine adjusting screws, stand condenser, live-cage and a pair of tweezers. The instrument as a whole is exceedingly handsome, and whether placed in the surgery, study, or laboratory, will not fail to attract attention and admiration. It is fitted into a neat polished mahogany cabinet with lock and key. Though designed specially for medical use it is equally appropriate for other pursuits or studies. The retail price of this instrument complete is £12 ($60).—*The Optician.*

## MICROSCOPICAL MANIPULATION.

**A Means of Recognizing Frozen Meats.**— M. Maljean in the *Archives de Medecine Militaire*, says: This means is based on the aspect of the globules of blood obtained by scraping. In the frozen meats, these globules are colorless, deformed and float in a greenish serum. There is no longer a single one in the normal state. The cold makes the red globules burst: then the coloring matter is extravasated in the serum, where it is found again under the form of irregular crystals colored yellowish brown.

**To Open A Rusty Knife.**—We are indebted to *The Inventive Age*, for the following article and for the use of the cuts with which to illustrate it.

Take a piece of soft but strong cord, wind it tightly from ten to fifteen times around the closed blades of the knife and of the knife body itself as shown in Fig. 1. Hold or tie the remaining end of the cord to your middle finger. Find a grassy

Fig. 1.

Fig. 2.

spot or soft place and throw the knife down with all your might, just as you do in spinning a top and as shown in Fig. 2. The centrifugal force, caused by the unwinding of the cord and the rapid rotation of the knife will make the blades fly open like the balls on a governor of a steam engine.

## BACTERIOLOGY.

**Exhibitions of Cholera Bacilli.**—Dr. J. H. Gottlieb, Professor of Microscopy in New York Medico-Legal Laboratory, having recently exhibited some cholera bacilli at the American Museum of Natural History, the matter was reported to the Board of Health, and Dr. H. M. Briggs, pathologist to the Board, was asked to make an investigation. On his report, the the Board passed a resolution at its meeting, April 26, prohibiting public exhibitions of such bacilli in the future.

**The Pasteur Institute.**—This institute has been removed from West 10th Street to its new quarters facing Central Park at West 97th Street. The building is a model structure erected expressly for the purposes of the institute. It is six stories in height, and has a frontage of 26 feet on 97th Street, and 100 feet on Central Park. On the first floor are the parlor, reception-room, operating-room, laboratories and the private offices of the director; on the sixth floor are the dining-rooms, kitchen, laundry and servants' appartments. The other floors will be occupied by patients undergoing treatment. On the roof there is a superstructure of iron, where animals used in obtaining virus for inoculations will be kept.—*M. and S. Journal.*

## MEDICAL MICROSCOPY.

**Medical Aspects of the Borden Case.**—The matter of blood-stains so far as an identification of human blood-corpuscles was concerned had a secondary importance in this trial. Numerous weapons were in evidence; but they were all found to be free from blood-stains, although most of them presented spots of rust or other discoloration that at first view were suspicious. The only spot of blood found on the clothing of the accused was a minute dot, not larger than the head of a small pin, situated on the back part of a white underskirt; the corpuscles in this stain showed a micro-metric diameter "consistent with" that of human blood-disks, but also not to be distinguished from the blood of menstruation.—*Boston Med. and Surg. Journal.*

**Tuberculosis** is very common in domestic fowls, but, strangely they do not ematiate under it as does the human subject.

## DIATOMS.

**Cultivation of Diatoms.**—Dr. L. Macchiati, in a communication to the *Journal de Micrographie*, points out that diatoms are easily cultivated in the nutritive solution used in vegetable physiology, provided that a few drops of silicate of potash be added to the medium. Or, the very water which the diatoms inhabit may be used. This when filtered, and with the addition of a few drops of strong silicate of potash solution, forms an excellent fluid. The medium placed in a watch-glass is then inoculated with a loopful of the water inhabited by the diatoms, and the two fluids having been thoroughly mixed together by stirring, a loopful of the mixture is placed on the surface of a cover-glass; the exact thickness is previously ascertained. To the margin of a cavity of a hollow-ground slide is then applied some vaseline, and this is carefully placed over the cover-glass. The slide, now containing a hanging-drop cultivation, is turned over. In such a drop the diatoms are in an almost natural state, and their development and mode of life may be watched under a power as high as 1-18, though the lens commonly employed by the author is a dry apochromatic with focal distance of 4 mm. and N. A. 0.95. In combination with eye-pieces 6, 12, and 18, magnifications of 372, 750, and 1, 125 were obtained. The best part for observing the diatoms is the edge of the drop, and this should be first centered under a low power.—*English Mechanic.*

## MICROSCOPICAL SOCIETIES.

### Calcutta, India.

*The year* 1892.—Number of Members, 81, an increase of 3. Receipts $200; Expenses $125; Balance on hand, December 31, $75. The Fifth Annual Report (7 pp.) was issued in January, 1893. Ten papers were read during 1892, as follows:

By J. Wood-Mason, (1) on the Stridulating organs in one of the Myriapods, (2) an elementary account of the Protozoa.

By W. J. Simmons, (1) on diatoms from Hungary, (2) the eye of *Eristalis tenax*, (3) on Hyaline Spherules found in terrace-dust.